

CLAIMS

What is claimed is:

1. A write once disc for use with a recording and/or reproducing apparatus, the disc comprising:

a record layer in which a lead-in area, a data area, and a lead-out area are sequentially positioned;

a defect management area in at least one of the lead-in area and the lead-out area;

a temporary defect management area in at least one of the lead-in area and the lead-out area and which includes temporary defect information and temporary defect management information including drive & disc information; and

a drive & disc information area in at least one of the lead-in area and the lead-out area and which includes information regarding locations of the temporary defect information and the temporary defect management information used by the recording and/or reproducing apparatus in performing defect management,

wherein a last recorded temporary defect information and a last recorded temporary defect management information, which are lastly recorded in the temporary defect management area are recorded in the defect management area for disc finalization by the recording and/or reproducing apparatus.

2. A write once disc for use with a recording and/or reproducing apparatus, the disc comprising:

a first record layer including, sequentially, a lead-in area, a data area, and a first lead-out area ;

a second record layer including, sequentially, an outer area, a data area, and a second lead-out area;

a defect management area in at least one of the lead-in area, the first lead-out area, the second lead out area, and the outer area;

a temporary defect management area in at least one of the lead-in area, the first lead-out area, the second lead out area, and the outer area, and which includes temporary defect information and temporary defect management information, which includes drive & disc information, used by the recording and/or reproducing apparatus in performing defect management; and

a drive & disc information area that is present in at least one of the lead-in area, the first lead-out area, the second lead out area, and the outer area, and which includes information regarding locations of the temporary defect information and temporary defect management information,

wherein a last recorded temporary defect information and a last recorded temporary defect management information, which are lastly recorded in the temporary defect management area, are recorded in the defect management area, for disc finalization.

3. The write once disc of claim 1, wherein write protect information is further recorded in the drive & disc information area.

4. The write once disc of claim 3, wherein:  
the data is written to the data area in discrete recording operations, and  
the write protect information is recorded for each of the recording operations.

5. The write once disc of claim 1, wherein the drive & disc information comprises at least one of the write protect information and the test location information.

6. The write once disc of claim 1, wherein the temporary defect information and the temporary defect management information are recorded in each recording operation in which data is recorded in the data area.

7. The write once disc of claim 1, comprising a plurality of at least one of the defect management area, the temporary defect management area, and the drive & disc information area.

8. The write once disc of claim 1, comprising a plurality of at least one of the temporary defect management area and the drive & disc information area more than once in the same area.

9. The write once disc of claim 1, further comprising a combined area including the temporary defect management area and the drive & disc information area.

10. A method of managing disc defects, comprising:  
recording information regarding a defect in data, which is recorded in a data area of a disc according to an ith recording operation, as ith temporary defect information several times in a temporary defect management area of the disc, where i is an index;  
recording information for managing the ith temporary defect information as ith temporary defect management information in the temporary defect management area;  
recording information regarding locations of the ith temporary defect information and the temporary defect management information in a drive & disc information area of the disc;  
repeating the recording the ith temporary defect information, the recording the ith temporary defect management information, and the recording the information regarding the locations at least once while increasing the index given to the recording operation, the temporary defect information, and the temporary defect management information; and  
recording a last recorded one of the temporary defect information and temporary defect management information in a defect management area of the disc for disc finalization.

11. The method of claim 10, further comprising recording write protect information in the drive & disc information area.

12. The method of claim 10, wherein during the recording the ith temporary defect management information, the ith temporary defect management information is recorded to include at least one of test location information and the write protect information.

13. The method of claim 10, wherein the recording the ith temporary defect information further comprises:

recording the data in predetermined units;  
verifying the recorded data to detect a defective area of the disc in which the defect exists;  
storing information that points to the defective area and information that points to a replacement area for the defective area as the first temporary defect information in a memory;  
repeating the recording the data in the predetermined units, the verifying the recorded data, and the storing the information at least once; and  
reading the information stored in the memory and recording the read information as the ith temporary defect information several times in the temporary defect management area.

14. A recording and/or reproducing apparatus for use with a disc, comprising:
  - a recording/reading unit that records data on and/or reads data from a data area of the disc; and
  - a controller that controls the recording/reading unit to:
    - record information regarding a defect in the data recorded in the data area, as temporary defect information in a temporary defect management area of the disc;
    - record management information for managing the temporary defect information as temporary defect management information in the temporary defect management area, the management information further including drive & disc information;
    - record information regarding locations of the temporary defect information and the temporary defect management information in a drive & disc information area of the disc; and
    - record a last recorded temporary defect information and temporary defect management information in a defect management area of the disc during disc finalization.

15. The recording and/or reproducing apparatus of claim 14, wherein the controller controls the recording/reading unit to further record write protect information in the drive & disc information.

16. The recording and/or reproducing apparatus of claim 14, wherein the controller controls the recording/reading unit to record the data in the data area in discrete recording operations, and to record the temporary defect information and the temporary defect management information for each of the recording operations.

17. The recording and/or reproducing apparatus of claim 14, wherein the controller controls the recording/reading unit to record the data in the data area in discrete recording operations, and to record the temporary defect management information to include test location information and write protect information for each of the recording operations.

18. The write once disc of claim 1, wherein the drive & disc information comprises information on a location of a test area of the disc and write protect information on whether information can be written to the disc.

19. The write once disc of claim 18, wherein the drive & disc information is also included in the drive & disc information area.

20. The write once disc of claim 19, wherein the drive & disc information area further includes information on a type of the disc, information on a drive used for a write and/or read operation.

21. The write once disc of claim 1, wherein the temporary defect management area further includes an address of a last recorded unit of user data and an address of a last recorded unit of replacement data which was recorded to replace a defective area.

22. The write once disc of claim 2, wherein the drive & disc information comprises information on a location of a test area of the disc and write protect information on whether information can be written to the disc.

23. The write once disc of claim 22, wherein the drive & disc information is also included in the drive & disc information area.

24. The write once disc of claim 23, wherein the drive & disc information area further includes information on a type of the disc, information on a drive used for a write and/or read operation.

25. The write once disc of claim 2, wherein the temporary defect management area further includes an address of a last recorded unit of user data and an address of a last recorded unit of replacement data which was recorded to replace a defective area.

26. A recordable disc for use with a recording and/or reproducing apparatus, the disc comprising:

a lead-in area;

a lead-out area;

a data area disposed between the lead-in and lead-out areas and in which data is recorded and/or from which data is reproduced;

a temporary defect management area in at least one of the lead-in area and the lead-out area and which includes temporary defect management information used by the recording and/or reproducing apparatus in accounting for defects in the disc; and

a drive & disc information area in at least one of the lead-in area and the lead-out area and which includes information regarding a location of the temporary defect management information.

27. The recordable disc of claim 26, wherein the temporary defect management area further includes temporary defect information managed by the temporary defect management information and used by the recording and/or reproducing apparatus in performing defect management, and information regarding a location of temporary defect information is recorded in the drive & disc information area.

28. The recordable disc of claim 27, wherein:

the data is recorded in corresponding recording units,

each recording unit has a corresponding pair of the temporary defect information and temporary defect management information for performing defect management with respect to at least the recording unit, and

the location of the temporary defect information comprises a location of an area in which is recorded a corresponding pair of the temporary defect information and the temporary defect management information for a corresponding recording unit.

29. The recordable disc of claim 26, wherein the drive & disc information area further includes write protection information with regard to recorded data in the data area.

30. The recordable disc of claim 29, wherein the drive & disc information area further includes a recordable area such that, if the write protection information indicates that the disc is write protected, additional write protection information is writeable to the recordable area such that the recording and/or reproducing apparatus can change a write protection status of the disc to again allow recording in the data area.

31. The recordable disc of claim 26, wherein the drive & disc information area further includes information about a type of drive and information about a type of disc.

32. The recordable disc of claim 26, further comprising a test area in which the data is not to be recorded and in which the recording and/or reproducing apparatus performs a test on the disc, wherein the drive & disc information area further includes information about the test area.

33. The recordable disc of claim 26, wherein the temporary defect management information further includes write protection information with regard to recorded data in the data area.

34. The recordable disc of claim 26, wherein temporary defect management information further includes information about a type of drive and information about a type of disc.

35. The recordable disc of claim 26, further comprising a test area in which the data is not to be recorded and which is reserved for the recording and/or reproducing apparatus to perform a test on the disc, wherein the temporary defect management information further includes information about the test area.

36. The recordable disc of claim 26, further comprising a spare area in which is recorded replacement data which is used by the recording and/or reproducing apparatus to replace a portion of the data area in which a defect is detected,

wherein the temporary defect management information further includes data location information about a location of a last recorded portion of the data and replacement location information about a location of a last recorded portion of the replacement data.

37. A recording and/or reproducing apparatus for use with a disc, comprising:  
a recording/reading unit that records data on and/or reads data from a data area of the disc; and  
a controller that controls the recording/reading unit to:

record information regarding a defect in the data recorded in the data area as temporary defect information in a temporary defect management area of the disc if defect management is being performed;

record management information including information for managing the temporary defect information as temporary defect management information in the temporary defect management area; and

record information regarding a location of the temporary defect management information in a drive & disc information area of the disc.

38. The recording and/or reproducing apparatus of claim 37, wherein, when the controller is performing defect management and the temporary defect information is recorded in the temporary defect management area, the controller controls the recording/reading unit to record information regarding a location of temporary defect information in the drive & disc information area.

39. The recording and/or reproducing apparatus of claim 38, wherein:  
the controller controls the data to be recorded in corresponding recording units,  
for each recording unit, the controller records a corresponding pair of the temporary  
defect information and temporary defect management information for performing defect  
management with respect to at least the recording unit in the temporary defect management  
area, and

the location of the temporary defect information recorded in the disc & drive information  
area comprises the location of an area in which is recorded a corresponding pair of the  
temporary defect information and the temporary defect management information for a  
corresponding recording unit.

40. The recording and/or reproducing apparatus of claim 37, wherein:  
the drive & disc information area further includes information about a type of the  
recording and/or reproducing apparatus and information about a type of the disc, and  
the controller uses the information of the type of the recording and/or reproducing  
apparatus and the type of the disc in recording and/or reproducing the data with respect to the  
data area.

41. The recording and/or reproducing apparatus of claim 37, wherein:  
the drive & disc information area further includes write protection information with regard  
to recorded data in the data area, and  
the controller does not record the data where the write protection status indicates that  
the disc is write protected.

42. The recording and/or reproducing apparatus of claim 41, wherein:  
the drive & disc information area further includes a recordable area, and  
even if the write protection information indicates that the disc is write protected, the  
controller records additional write protection information to the recordable area such that the  
recording and/or reproducing apparatus can change a write protection status of the disc to again  
allow recording in the data area.

43. The recording and/or reproducing apparatus of claim 41, wherein, even if the write protection information indicates that the disc is write protected, the controller records the temporary defect management information, the temporary defect information, and/or replacement data for data which is recorded in a defective portion of the data area so as to perform defect management for the write protected disc.

44. The recording and/or reproducing apparatus of claim 37, wherein:  
the disc further comprises a test area in which the data is not to be recorded and which the controller recognizes as being reserved for the recording and/or reproducing apparatus to perform a test on the disc, and  
the controller detects a location of the test area from information recorded in the drive & disc information area.

45. The recording and/or reproducing apparatus of claim 37, wherein:  
the controller records write protection information in the temporary defect management information, and  
the controller uses the write protection information to determine whether additional data can be written to the data area.

46. The recording and/or reproducing apparatus of claim 37, wherein the controller further includes in the temporary defect management information about a type of the recording and/or reproducing apparatus and information about a type of the disc.

47. The recording and/or reproducing apparatus of claim 37, wherein:  
the disc further comprises a test area in which the data is not to be recorded and which the controller recognizes as an area reserved for the recording and/or reproducing apparatus to perform a test on the disc, and  
the controller records in the temporary defect management information a location of the test area.

48. The recording and/or reproducing apparatus of claim 37, wherein:

the disc further comprises a spare area,

the controller detects a defect in the data recorded in the data area and controls the recording/reading unit to record replacement data to replace a portion of the data area in which the defect is detected,

the temporary defect management information further includes data location information about a location of a portion of the data and replacement location information about a location of a portion of the replacement data, and

the controller detects an amount of recordable space in the data area and the spare area using the data location information and the replacement location information recorded in the temporary defect management information.

49. A computer readable medium encoded with processing instructions for implementing the method of claim 10 performed by a computer.